R-FILTER

UV PHOTOCATALYTIC DEODORIZER
AND DISINFECTION DEVICE

NANOTECHNOLOGY

IN THE

AIR PURIFICATION

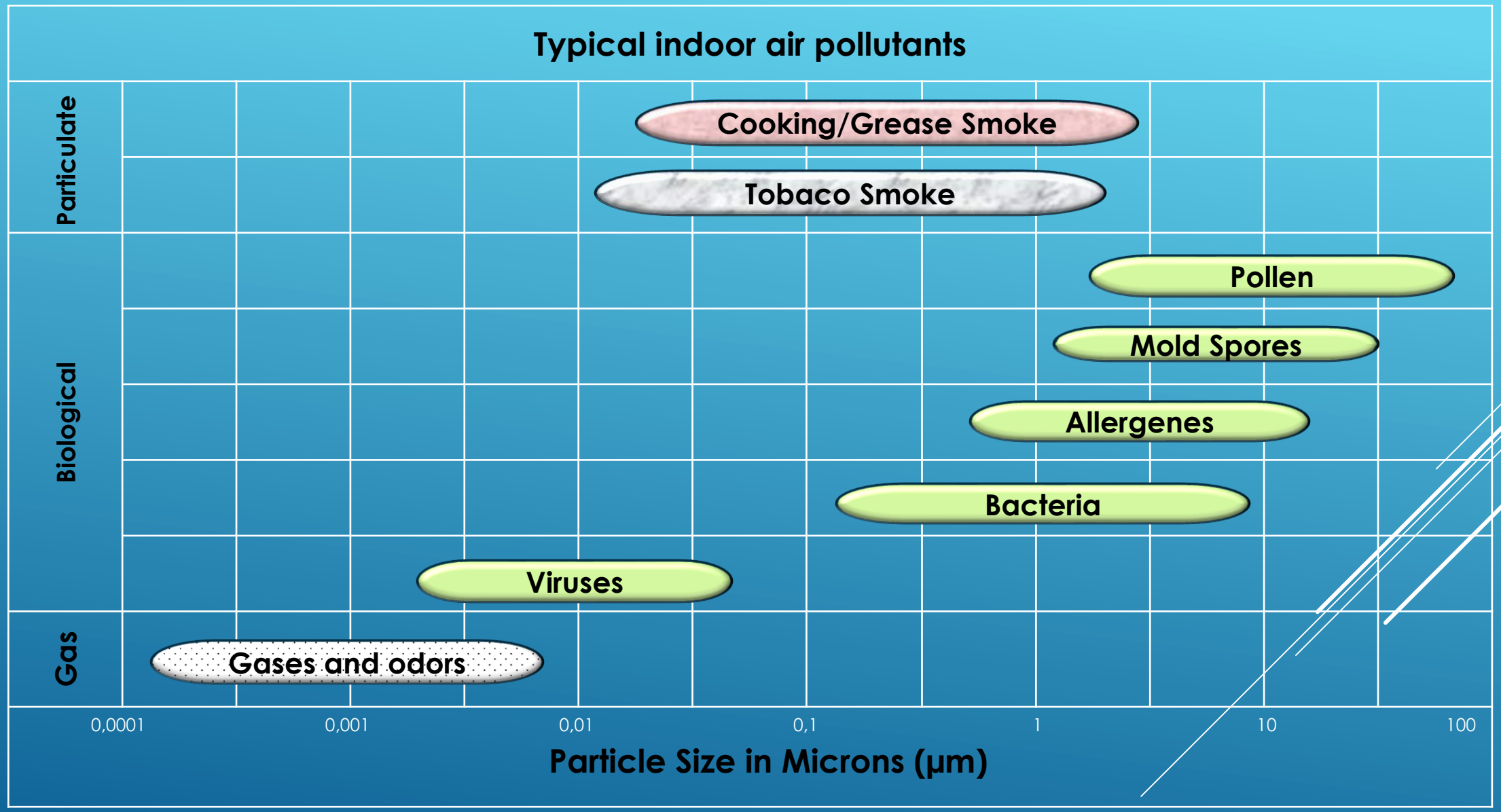
Powered by:

R-FILTER

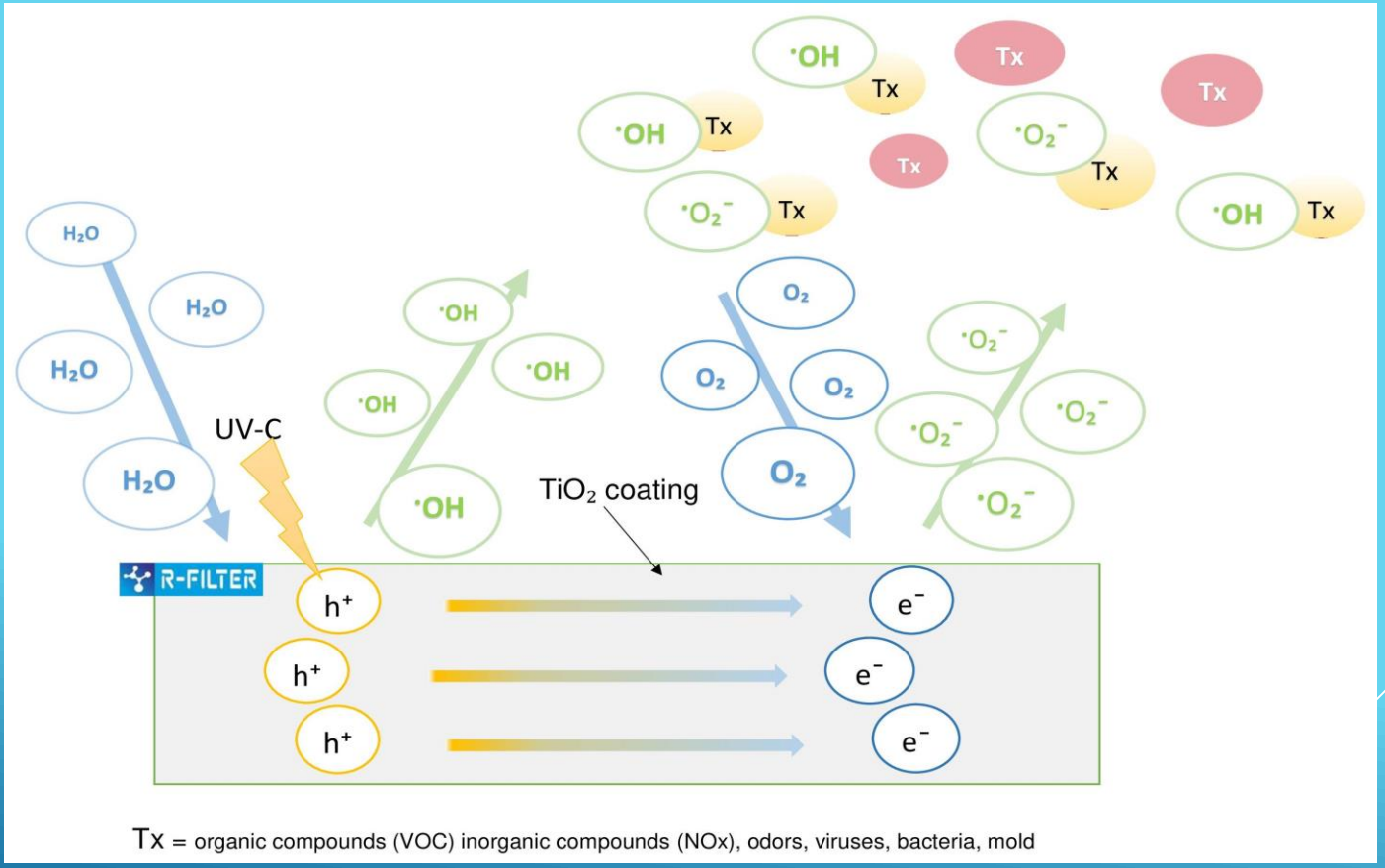
Have you ever heard of nanotechnology? Or have you heard about nano technology in the air purification?

Backround:

- It is known that surfaces coated with nano- TiO_2 based photocatalyst show self-cleaning activities under the influence of sunlight
- The secret of this success is the nanotechnology
- Nanotechnology is manipulation of materials on an atomic, or molecular scale, having size of 0.1 to 100 nm. One meter = 1.000.000.000 nanometer
- In photocatalytic air purifiers the catalyst that cleans the air is typically nano-TiO_2 activated by ultraviolet (UV) light


Typical indoor air pollutants
Particulate
Biological
Gas
Cooking/Grease Smoke
Tobaco Smoke
Pollen
Mold Spores
Allergenes
Bacteria
Viruses
Gases and odors
0,0001
0,001
0,01
0,1
1
10
100
Particle Size in Microns (µm)

- Titanium dioxide coated metal plates are used as photocatalyst in our wall and ceiling models. There are fans in the device to circulate the air in the room, to be deodorized and disinfected.
- The air is first exposed to a disinfecting high-intensity ultraviolet light of germicidal wavelength (254 nm) and then flows touching the UV light-activated photocatalyst. On the surface coated with TiO_2 the following air purification process takes place:



- The above coating is a semiconductor and when light of a certain wavelength excites the surface of the titanium dioxide, electrons (e^-) are transferred from the valence band to the conduction band.

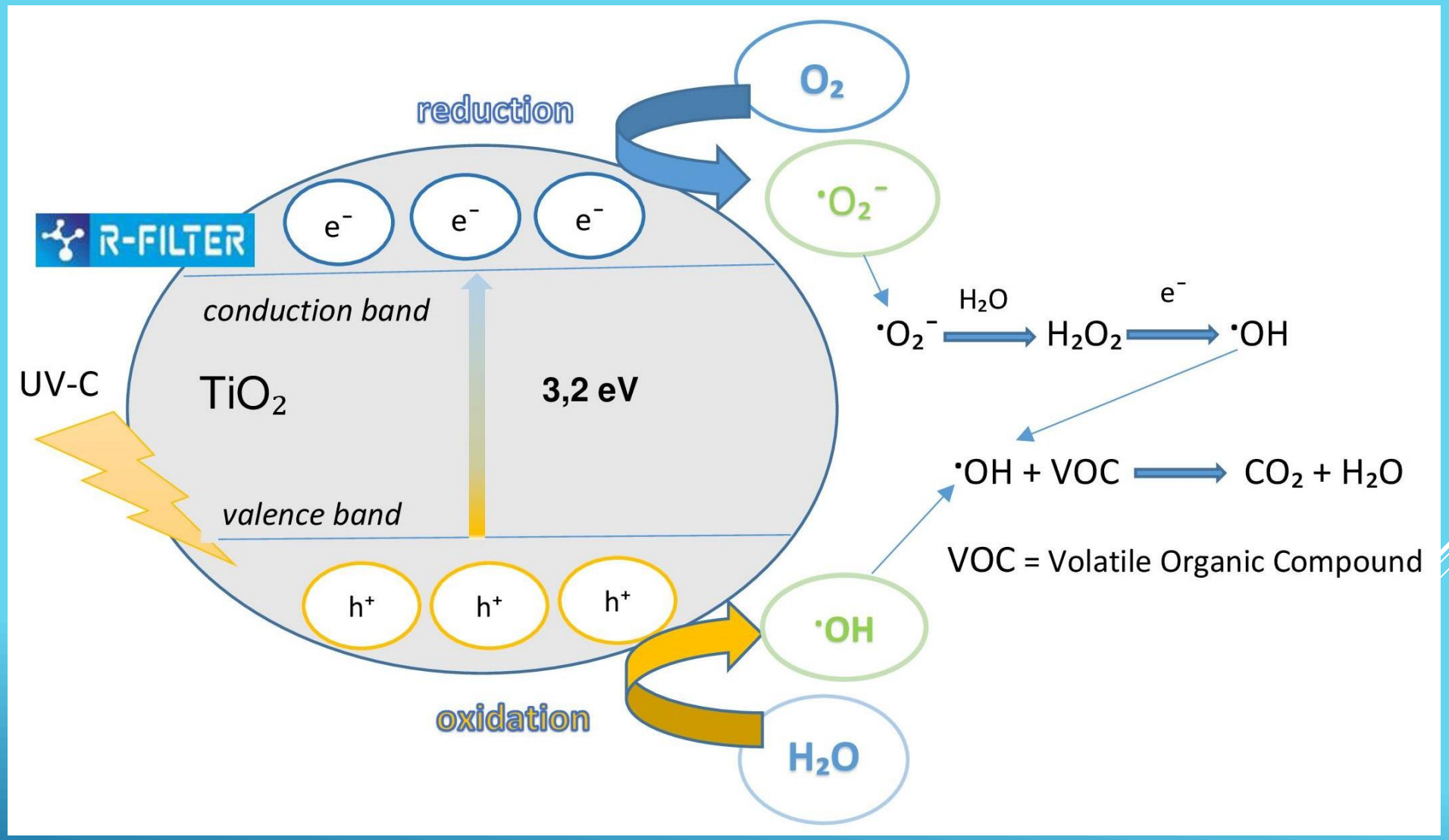
- At the same time, holes (h^+) are formed in the valence band.

- The holes oxidize strongly, while the electrons have a strong reducing effect.

- From the water arise highly reactive hydroxyl radicals ($^{\cdot}OH$) and from the atmospheric oxygen reactive superoxide radicals ($^{\cdot}O_2^-$).

- As a result, the pollutants are decomposed. Moreover, the ultraviolet rays change the DNA structure of microorganisms and cause their destruction. Pollutants and microorganisms will be mineralized into harmless end products such as water and carbon dioxide.

A "sectional view" about the degradation of the Volatile Organic Compounds:



Type of devices:

Type	Colour	Size LxWxH (mm)	Max. air flow (m^3/h)	Supply voltage (V_{AC})	UVC lamps	Fans	Input elektric power (W)	Current flow (mA)	UVC output ($W_{253,7nm}$)	Safety device: Door contact switch
UVE 110KUB	black	550x600x150	180	230/50	4x25W	3x18W	154	700	4x7,2W	✓
UVE 110KUC	chromic	550x600x150	180	230/50	4x25W	3x18W	154	700	4x7,2W	✓
UVE 220KUB	black	1000x600x150	300	230/50	4x55W	5x18W	310	1350	4x19W	✓
UVE 220KUC	chromic	1000x600x150	300	230/50	4x55W	5x18W	310	1350	4x19W	✓

Areas of use:

- **Public areas, offices, doctors' waiting rooms, grocery and other retail outlets, restaurants, hotels, laboratories, smoking rooms and toilets**
- **The device can be used wherever unpleasant odors and harmful organic compounds, mold spores, fungi, viruses and bacteria are to be eliminated.**

Advantages of the device:

- **Synergistic effect of photooxidation and photocatalysis**
- **TiO_2 makes the UV more effektive**
- **There is no filter in the device**
- **Works without chemicals**

- Ozone free
- Low energy costs, programmable cycle times
- Rated average life of UVC lamps: 9000 hours (80% output performance)
- The house is made of stainless steel, no risk of corrosion
- Minimal maintenance effort
- Easy to install